

REMARKS

There are now pending in this application claims 1-5 and 10-35, of which claims 1 and 32 are independent. Claims 6-9 have been canceled without prejudice or waiver of their subject matter. No claims have been added. As the Examiner will appreciate, the subject matter of claims 6-9 has been incorporated into claim 1 and the subject of claims 6 and 9 has been incorporated into claim 32.

In view of the above amendments and the following remarks, favorable reconsideration and allowance of the above application is respectfully sought.

The invention as featured in independent claim 1 is directed to a process for producing an electrophotographic photosensitive member and comprises the steps of placing a cylindrical substrate having a conductive surface in a first film-forming chamber having an evacuation means and a source gas feed means and capable of being made vacuum-air tight, and decomposing a source gas by means of a high-frequency power to deposit on the cylindrical surface a first layer formed of a non-single-crystal material. In the second step, the cylindrical substrate upon which the first layer has been deposited is taken out of the first film-forming chamber. Thereafter, the cylindrical substrate on which the first layer has been deposited is placed in a second film-forming chamber having an evacuation means and a source gas feed means and capable of being made vacuum-air tight, and the source gas is decomposed by means of a high-frequency power to deposit on the first layer a second layer comprising upper-part blocking layer formed of a non-single-crystal material.

As amended, claim 1 is now characterized in that the upper-part blocking layer comprises a non-single-crystal material composed chiefly of silicon atoms and containing at least one of carbon atoms, oxygen atoms and nitrogen atoms. The upper-part blocking layer further contains atoms capable of controlling conductivity, with the atoms capable of controlling conductivity belong to Group 13 or Group 15 of the Periodic Table and being incorporated in the upper-part blocking layer in a content of from 100 atomic ppm or more to 30,000 atomic ppm or less.

Independent claim 32 corresponds to an electrophotographic photosensitive member which comprises a cylindrical substrate having a conductive surface, a first layer comprising a photoconductive layer and a second layer comprising an upper-part blocking layer formed of a non-single-crystal material composed chiefly of silicon atoms and containing an element belonging to Group 13 or Group 15 of the Periodic Table. As recited in independent claim 32, the first layer is a layer from which hill portions of spherical protuberances present on it surface have been removed. Independent claim 32 is characterized in that the non-single-crystal material is composed chiefly of silicon atoms and contains at least one carbon atom, oxygen atom and nitrogen atom, and that the element belonging to Group 13 or Group 15 of the Periodic Table is incorporated in the upper-part blocking layer in a content of from 100 atomic ppm or more to 30,000 atomic ppm or less.

Claims 1-35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ehara et al. (U.S. Patent No. 6,846,600) in view of Tsuchida et al. (U.S. Patent No. 6,379,852). Given the above amendments and the following remarks, those rejections are respectfully traversed.

Applicants' invention as presented in the claims of the above-identified application are directed toward solving technical problems that arise on depositing the upper-part blocking layer. As set forth in more detail, at least on page 18, lines 9-18, of the subject specification, the inventors have found that when film formation conditions under which the spherical protuberances grow from a midpoint of a deposited film and are picked out, and an upper-part blocking layer is provided on the surface of the deposited film formed on a substrate under such conditions, the upper-part blocking layer cannot prevent electric charges from being injected from the spherical protuberances, thereby causing image defects.

Ehara et al. relates to a process for producing an electrophotographic photosensitive member which comprises the steps of depositing on a cylindrical substrate a photoconductive layer formed of a non-single-crystal material, subjecting to surface processing the deposited film having protrusions present at its surface, and depositing on the process surface a surface protective layer formed of a non-single-crystal material. However, Ehara et al. makes no mention teaching or suggesting the constituents of the upper-part blocking layer now called for in each of independent claims 1 and 32. Moreover, the intermediate layer in Ehara et al. is an a-SiC, N, O layer which is not a layer that is intended for inhibiting charge injection from the free surface side. Ehara et al. does not address nor propose solutions to the problems to which the present invention is concerned.

The secondary reference to Tsuchida et al. is directed to an electrophotographic light receiving member. However, Tsuchida et al. does not teach or suggest the step of taking out of the first film-forming chamber the cylindrical substrate on which the first layer has been

deposited, as recited in each of independent claims 1 and 32. Moreover, there is no teaching or suggestion of the problems to which the present invention is directed, nor their solutions.

For the foregoing reasons, it is respectfully submitted that the prior art, even if taken in combination, does not teach or suggest the invention as now recited in each of independent claims 1 and 32.

The remaining claims in the above application are dependent claims which depend either directly or indirectly from claim 1 or claim 32 and are therefore patentable over the art of record for the reasons noted above with respect to those claims. In addition, each recites features of the invention still further distinguishing it from the applied art. Favorable and independent consideration thereof is respectfully sought.

Claim 1 had been provisionally rejected under the judicially created doctrine of obviousness-type double patenting in view of copending application number 10/630,727. Since claim 1 has been amended to incorporate the subject matter of claims 6-9, and since none of claims 6-9 were rejected under the judicially created doctrine of obviousness-type double patenting, it is respectfully submitted that those amendments address and overcome such provisional rejection.

Lastly, Applicants submit herewith a copy of page 111 of the specification, which includes Table A-23 thereon. Applicants believe that the attached copy is of superior quality sufficient for purposes required by the U.S. Patent and Trademark Office. The copy is identical to that submitted with the original application.

Applicants respectfully submit that all outstanding matters in this application have been addressed and that the application is in condition for allowance. Favorable reconsideration and an early passage to issue of the above application are respectfully sought.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010 All correspondence should continue to be directed to our address given below.

Respectfully submitted,



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Table A-23

		Lower-part blocking layer	Photocon- ductive layer
5	Source gas and flow rate:		
	SiH <sub>4</sub> [ml/min(normal)]	80	400
	H <sub>2</sub> [ml/min(normal)]	300	800
	PH <sub>3</sub> (ppm) (based on SiH <sub>4</sub> )	2,500	0.3
10	NO [ml/min(normal)]	4	-
	Substrate temperature:		
	(°C)	280	280
	Reactor internal pressure:		
	(Pa)	0.6	0.7
15	High-frequency power:		
	(W)	400	1,000
	Layer thickness:		
	(μm)	2	28

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Next, each substrate on which the first layer was deposited was first taken out of the first film-forming chamber into the atmosphere. Then, in this Example, at this stage, its surface was polished by means of the polishing apparatus shown in Fig. 7, to flatten the protuberant portions of the spherical protuberances. Thereafter, this was cleaned by means of the water washing system shown in Fig. 8. Then, the substrate on which the first layer was deposited, having been polished and cleaned, was moved to the second film-forming chamber shown in Fig. 5, where as the second layer an upper-part blocking layer and a surface layer were deposited on the first layer under conditions shown in Table A-24. In this Example,